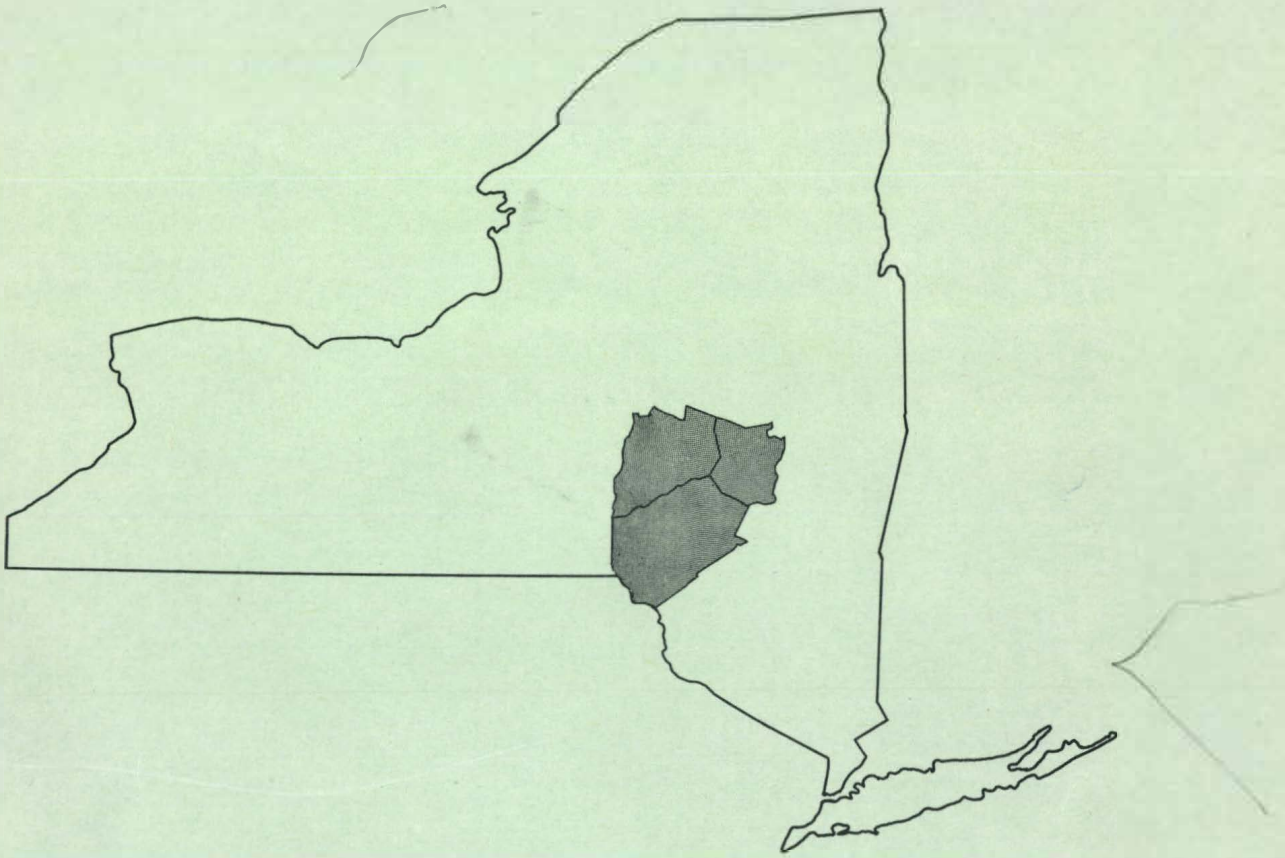
Forest Statistics For NEW YORK Forest District No. 1



NORTHEASTERN FOREST EXPERIMENT STATION
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
Upper Darby, Pa. V. L. Harper, Director

FOREST STATISTICS SERIES: NEW YORK NO. 1

June 1957

FOREWORD

This is the first in a series of reports about the forest areas and timber volumes in the State of New York. It is a product of the forest survey of the Northeast, carried on by the Northeastern Forest Experiment Station as part of the nation-wide forest survey being made by the Forest Service, U. S. Department of Agriculture.

A similar report is contemplated for each of the other forest districts in the State of New York. The primary purpose of these reports is to provide basic forest statistics for the administrative use of the New York Department of Conservation.

The active cooperation by the New York Department of Conservation aided the Northeastern Station greatly in the forest survey of the State. The Department not only provided the aerial photographs used in the survey, but also cooperated in many other phases of the work.

Field work done in Forest District No. 1 by the Northeastern Forest Experiment Station was supervised by Harry W. Camp, Jr. The statistical procedures for obtaining field-inventory data were developed by C. Allen Bickford. Computations were made under the supervision of Roland H. Ferguson.

V. L. Harper
Director

CONTENTS

FOREST STATISTICS FOR

NEW YORK FOREST DISTRICT No. 1

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Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

June 1951

GENERAL

NEW YORK'S FOREST District No. 1 contains three counties (Delaware, Otsego, and Schoharie) located in the southeastern part of the State.

Otsego County and the northern part of the other two counties lie in the Appalachian Plateau. This is open, rolling, dairy country--an important part of New York City's milkshed. It is extensively farmed and contains most of the larger population centers in the district.

Here the valleys and gently rolling slopes are used for crops and pasture. The steeper slopes and hills and ridges are covered with forest. The forests are generally small. Seen from the air, the pattern is a lacework of forests on open farm land.

The southern and eastern parts of Delaware and Schoharie Counties lie in the Catskill Mountains. Here the valleys are narrower, the slopes steeper. The forests are more extensive. Summer homes and winter sports attract vacationers to this section.

The Forest Area

The three counties in Forest District No. 1 contain almost 2 million acres. Less than half of this, 916,000 acres, is forest land.

Some 33,000 acres are reserved from commercial timber use: they are in the Catskill Forest Preserve. All the rest of the forest land is classed as commercial, including public lands such as Gilbert Lake State Park, Bear Spring Mountain Game Refuge, State reforestation areas, and the watershed forests owned by the City of New York.

This commercial forest land totals 882,700 acres. Of this, 467,300 acres are in Delaware County, 235,200 acres in Otsego County, and 180,200 acres in Schoharie County.

Ownership

More than 90 percent of the commercial forest land in Forest District No. 1--that is, forest land not reserved from commercial timber use—is privately owned. Some 370 thousand acres of this forest land are on farm properties. Of the 430 thousand acres held by other private owners, some is owned by estates, railroads, and utility companies. Much of it is on abandoned farms that have been bought by summer residents or local people other than farmers. There are no large forest-industry holdings in the district.

About three-fourths of the 80,000 acres of publicly owned commercial forest land in the district are held by the State of New York as reforestation areas (see table 2). The Federal Government owns no forest land in the district.

The Forest Types

The predominant forest type in the district is northern hardwoods: sugar maple-beech-yellow birch. This type, which covers extensive areas in the Northeast, is potentially one of the country's most valuable types. In Delaware and Otsego Counties it occupies nearly the entire forested area.

In Schoharie County, however, oak types cover about one-third of the forest land. Slightly less than one-third is occupied by white pine and hemlock. The remainder is in northern hardwoods and miscellaneous forest types.

Condition Of The Forests

About 60 percent of the merchantable sawlog material is found on less than one-fifth of the commercial forest land. This is the land that carries 5,000 or more board feet per acre.

On the other four-fifths of the commercial forest land most of the stands are run down. Their growing stock is depleted as a result of continued high-grading--cutting the better trees and leaving the inferior trees in possession of the land. Many acres have been stripped for acid wood. Poorly stocked seedling and sapling stands and areas less than 10 percent stocked cover more than 100,000 acres.

Timber Volume

Forest District No. 1 contains more than 2 billion board feet of sawlog material in saw-timber trees. Four-fifths of this material is hardwood. The leading species are sugar maple (31 percent), beech (14 percent) and hemlock (14 percent).

All merchantable trees 5 inches and larger in diameter (including the sawlog material mentioned above) contain a total net volume of 845 million cubic feet. (Including bark, the cubic volume equals some 13 million standard cords.) More than half of this volume is found in pole trees. Poor cutting practices account for this lack of balance between components of the growing stock.

In using these volume estimates, please bear in mind that some of this so-called "merchantable" timber currently cannot be logged economically. Topography, prices and markets, species, quality, and volume per acre have to be considered, because these are factors that help determine whether you can cut timber for a profit. For example, light saw-timber stands can seldom be cut for factory sawlogs at a profit. But for pulpwood they may be attractive logging chances.

International vs. Doyle Rule

We have used the International 1/4-inch rule in calculating board-foot volume. This log rule gives the closest approximation to the green-lumber tally (in inch-thick

boards) that trees of various diameters will yield at the sawmill. In New York it is the legal rule for contracts that do not specify some other rule.

The Doyle log rule--commonly used in New York--gives a lower estimate than the International. The difference is greatest for the smaller trees. Here are the saw-timber volumes in District No. 1 as reckoned with the two rules:

	International (M bd. ft.)	*Doyle* (M bd. ft.)
Softwood	468,500	290,500
Hardwood	1,686,100	1,146,500
All saw timber	2,154,600	1,437,000

Doyle volume of all saw timber is 67 percent of International volume--softwood 62 percent and hardwood 68 percent.

Cull Trees

In addition to the volume in merchantable trees, there are 196 million cubic feet (3 million cords) in the sound portions of cull trees. Some of the cull trees--if not too large, too rough, or too rotten--may be usable as pulpwood. But most of the cull volume is a forest liability because it has no present market--not even as fuel.

Net volume in cull trees amounts to nearly 25 percent of the volume in merchantable trees. In terms of gross volume the percentage is considerably higher. As much as a third of the growing space is now occupied by inferior trees. Unless markets for this low-grade wood can be developed, cull trees should be removed by girdling or poisoning.

Forest Survey Methods

Estimates of forest area and timber volume in District No. 1 are based on data obtained by sampling methods. The samples are a large number of plots distributed uniformly over the entire District.

These plots were first spotted on aerial photographs. Trained photo interpreters then examined each photograph. They classified the plots according to stand size and forest type. Field crews inspected a portion of the plots on the

ground--enough to obtain the statistical accuracy necessary. Species and volume data were obtained from these ground plots.

The survey was designed for maximum accuracy in the estimate of total merchantable cubic volume. You will find a discussion of accurary and definitions of terms in the Appendix.

Table 1.--Land area by major classes of forest land, 1949

Class of land[1]	Area	
	Acres	Percent
Forest land:		
Commercial	882,700	44.4
Reserved	33,100	1.6
Total forest land	915,800	46.0
Nonforest land	1,073,300	54.0
All land[2]	1,989,100	100.0

[1] See "Definition of Terms" in Appendix.

[2] From Areas of the United States 1940, Bureau of the Census.

Table 2.--Ownership of commercial forest land, 1949

Ownership class	Acreage held	
	Acres	Percent
Private		
Farm forest land[1]	370,600	42.0
Other private	432,000	48.9
Total private	802,600	90.9
Public		
State[2]	67,300	7.6
County	4,100	.5
Municipal[3]	8,700	1.0
Total public	80,100	9.1
All ownerships	882,700	100.0

[1] Census of Agriculture, 1945.

[2] Includes 1,500 acres in Gilbert Lake State Park, 7,400 acres in Bear Spring Mountain Game Refuge, and 58,400 acres in State reforestation areas.

[3] Includes 6,100 acres owned by the City of New York.

Table 3.--Commercial forest area by forest type, 1949

Forest type	Area	
	Acres	Percent
Hemlock	54,900	6.2
White pine	51,000	5.8
White pine-hardwood	42,300	4.8
Spruce-fir and hardwood-spruce-fir	12,600	1.4
Sugar maple-beech-yellow birch	537,900	61.0
Aspen-gray birch	26,400	3.0
Paper birch	9,000	1.0
Black ash-maple-elm and bottomland hardwood	20,400	2.3
Oak-white pine	50,500	5.7
Red oak	41,800	4.7
White oak	25,300	2.9
Chestnut oak	10,600	1.2
All types	882,700	100.0

Table 4.--Commercial forest area by stand-size class[1] and forest-type group, 1949

Forest type	Saw-timber stands		Pole-timber stands	Other stands[2]
	More than 5,000 bd.ft. per acre	1,500-5,000 bd.ft. per acre		
	Acres	Acres	Acres	Acres
Hemlock, white pine, white pine-hardwood, spruce-fir, and hardwood-spruce-fir types	31,200	42,500	35,800	51,300
Sugar maple-beech-yellow birch, aspen-gray birch and paper birch, black ash-maple-elm, and bottomland hardwood types	114,000	184,100	227,800	67,800
Oak-white pine, red oak, white oak, and chestnut oak types	9,400	38,500	56,300	24,000
All types	154,600	265,100	319,900	143,100
Percent	17.5	30.0	36.3	16.2

[1] Definitions in Appendix, page 17.

[2] Includes 28,700 acres of seedling and sapling stands that are 10-39 percent stocked and 74,700 acres of forest land that are less than 10 percent stocked.

Table 5.—Commercial forest area by stand-size class and watershed, 1949

Stand-size class	Watershed			Total
	Delaware	Mohawk[1]	Susquehanna	
	Acres	Acres	Acres	Acres
Saw-timber stands of--				
More than 5,000 bd.ft. per acre	62,100	33,200	59,300	154,600
1,500-5,000 bd.ft. per acre	100,000	63,100	102,000	265,100
Pole-timber stands of--				
600 cu.ft.-1,500 bd.ft. per acre	165,200	35,600	42,600	243,400
200-600 cu.ft. per acre	25,000	19,800	31,700	76,500
Sapling and seedling stands	20,700	30,700	17,000	68,400
Nonstocked stands	18,800	29,700	26,200	74,700
All stands	391,800	212,100	278,800	882,700
Percent	44.4	24.0	31.6	100.0

[1] Includes 8,900 acres of the Hudson River watershed.

Table 6.--Net volume in live timber on commercial forest land by forest type, 1949

Forest type	All merchantable trees[1] (including saw-timber trees)		Saw-timber trees only[2]
	Thousand cu.ft.	Equivalent in cords	Thousand bd.ft.
Hemlock	71,900	989,900	213,400
White pine	24,600	316,800	84,700
White pine-hardwood	17,100	240,200	46,000
Spruce-fir and hardwood-spruce-fir	4,700	68,500	10,300
Sugar maple-beech-yellow birch	630,600	9,607,300	1,604,200
Aspen-gray birch and paper birch	11,000	167,500	1,100
Black ash-maple-elm and bottomland hardwood	8,000	122,500	22,100
Oak-white pine	34,300	501,200	102,200
Red oak	18,000	272,400	27,600
White oak	17,400	265,700	20,900
Chestnut oak	7,000	97,400	22,100
All types	844,600	12,649,400	2,154,600

[1] Trees 5.0 inches d.b.h. and larger. Cubic-foot volume includes all sound wood, in central bole only, to not less than a 4.0-inch top, inside bark. Excluded are cull trees--those which cannot meet saw-timber tree specifications now or prospectively. Cord volume includes bark and is derived from cubic volume on the basis of 78 cubic feet of softwood, or 65 cubic feet of hardwood, per standard cord (4-foot bolts).

[2] Containing at least one merchantable 8-foot sawlog and with 50 percent or more of gross tree volume in merchantable sawlog material. Includes softwood trees not less than 9.0 inches, and hardwoods not less than 11.0 inches, in diameter at breast height. All board-foot volumes refer to International 1/4-inch rule.

Table 7.--Net volume in live timber on commercial forest land by stand-size class, 1949

Stand-size class	All merchantable trees (including saw-timber trees)		Saw-timber trees only
	Thousand cu.ft.	Equivalent in cords	Thousand bd.ft.
Saw-timber stands			
More than 5,000 bd.ft. per acre			
Softwood	65,000	833,300	286,800
Hardwood	226,100	3,478,500	971,800
Total	291,100	4,311,800	1,258,600
1,500-5,000 bd.ft. per acre			
Softwood	50,300	644,900	148,800
Hardwood	266,200	4,095,400	586,800
Total	316,500	4,740,300	735,600
Pole-timber stands			
600 cu.ft.-1,500 bd.ft. per acre			
Softwood	16,000	205,100	29,500
Hardwood	174,400	2,683,100	91,200
Total	190,400	2,888,200	120,700
200-600 cu.ft. per acre			
Softwood	2,800	35,900	3,400
Hardwood	25,800	396,900	13,600
Total	28,600	432,800	17,000
Other stands			
Softwood	200	2,600	--
Hardwood	17,800	273,800	22,700
Total	18,000	276,400	22,700
All stands			
Softwood	134,300	1,721,800	468,500
Hardwood	710,300	10,927,700	1,686,100
Total	844,600	12,649,500	2,154,600

Table 8.--Net volume in live timber on commercial forest land by species, 1949

Species	All merchantable trees (including saw-timber trees)		Saw-timber trees only
	Thousand cu.ft.	Equivalent in cords	Thousand bd.ft.
Hemlock	86,400	1,107,700	292,800
White pine	45,800	587,200	170,700
Spruce and other softwood	2,100	26,900	5,000
All softwood	134,300	1,721,800	468,500
Sugar maple	202,700	3,118,500	659,900
Beech	122,600	1,886,200	307,000
Red maple	100,300	1,543,100	154,300
Red oak	50,300	773,800	151,900
Basswood	43,500	669,200	116,600
Ash	63,900	983,100	95,900
Yellow birch	48,200	741,500	89,600
Black cherry	10,400	160,000	36,400
White oak	10,800	166,200	28,200
Elm	11,200	172,300	18,100
Aspen	12,000	184,600	3,200
Other hardwood[1]	34,400	529,200	25,000
All hardwood	710,300	10,927,700	1,686,100
All species	844,600	12,649,500	2,154,600

[1] Includes 10,600,000 cu.ft. or 160,000 cords of so-called non-merchantable species such as hophornbeam and pin cherry. The board-foot volume in such species is negligible.

Table 9.--Net volume in live timber on commercial forest land by diameter class, 1949

Diameter class[1] (inches at breast height)	All merchantable trees (including saw-timber trees)		Saw-timber trees only
	Thousand cu.ft.	Equivalent in cords	Thousand bd.ft.
Softwood			
6	13,600	174,400	--
8	24,900	319,200	--
10	19,200	246,200	74,000
12	17,300	221,800	79,300
14	14,000	179,500	69,800
16	18,200	233,300	93,400
18	8,900	114,100	47,500
20	5,500	70,500	30,100
22	5,000	64,100	28,300
23 and more	7,700	98,700	46,100
All softwood	134,300	1,721,800	468,500
Hardwood			
6	113,000	1,738,600	--
8	133,300	2,050,800	--
10	146,500	2,253,800	--
12	77,000	1,184,600	324,700
14	52,300	804,600	259,900
16	40,400	621,500	215,900
18	39,200	603,100	222,300
20	25,300	389,200	149,100
22	30,100	463,100	179,000
24	19,700	303,100	119,300
26	25,600	393,800	165,000
28 and more	7,900	121,500	50,900
All hardwood	710,300	10,927,700	1,686,100
Softwood and hardwood	844,600	12,649,500	2,154,600

[1] Each class includes all noncull trees falling within the range from 1.0 inch less to 0.9 inches more than the indicated diameter, thus the 6-inch class includes diameters in the range 5.0 to 6.9, inclusive.

Table 10.--Sound wood volume in live cull trees (5.0 inches d.b.h. and larger) on commercial forest land, 1949

Tree-size class and species group	Sound wood volume	
	Thousand cu.ft.	Equivalent in cords
SOUND CULL TREES[1]		
Pole-timber size		
Softwood	1,700	21,800
Hardwood	22,000	338,500
Total	23,700	360,300
Saw-timber size		
Softwood	19,600	251,300
Hardwood	72,500	1,115,400
Total	92,100	1,366,700
UNSOUND CULL TREES[2]		
Pole-timber size		
Softwood	300	3,800
Hardwood	7,600	116,900
Total	7,900	120,700
Saw-timber size		
Softwood	2,700	34,600
Hardwood	69,600	1,070,800
Total	72,300	1,105,400

[1] A sound cull tree is one that is too rough or crooked to make a merchantable saw-timber tree now or prospectively.

[2] An unsound cull tree is one that is too rotten to make a merchantable saw-timber tree now or prospectively.

Table 11.--Average net volume per acre in live timber on commercial forest land by stand-size class, 1949

Stand-size class (and acreage of each class)	All merchantable trees (including saw-timber trees)		Saw-timber trees only
	Cu.ft.	Equivalent in cords	Bd.ft.
Saw-timber stands of--			
More than 5,000 bd.ft. per acre (154,600 acres)	1,880	28	8,100
1,500-5,000 bd.ft. per acre (265,100 acres)	1,190	18	2,800
Pole-timber stands of--			
600 cu.ft.-1,500 bd.ft. per acre (243,400 acres)	780	12	500
200-600 cu.ft. per acre (76,500 acres)	370	6	220
Other stands (143,100 acres)	130	3	160
All stands[1]	960	14	2,400

[1] Hardwood constitutes 78 percent of the total board-foot volume, or 84 percent of the total cubic-foot volume, in all stands.

APPENDIX

ACCURACY OF THE ESTIMATES

The estimates in this report may contain two kinds of error.

First, photo interpreters may make mistakes in classifying plots, and field crews may make mistakes in measuring trees. There is no way of knowing how large these errors may be. We try to keep these mistakes and errors in computation to a minimum by closely checking all phases of the work.

Another kind of error is associated with sampling procedures. However, the size of this error can be measured. Calculations show that the chances are two to one that the error in our estimates lies somewhere within these limits:

	Percent (plus or minus)
Total forest area	1.6
Total timber volume, board-foot basis	9.7
Total timber volume, cubic-foot basis	4.8

As these percentages indicate, area data are more accurate than volume data. Cubic-foot volume estimates are more accurate than board-foot volume estimates. Totals are more accurate than subtotals.

DEFINITIONS OF TERMS

Forest Land

Forest land.--Land that bears forest growth stocked at least to 10 percent with trees of any size, or land that formerly bore such growth and is not now put to any other use. To classify as forest land a tract must contain at least 1 acre, and isolated strips of timber must be at least 120 feet wide.

Commercial forest land.--Forest land that is producing, or is capable of producing, usable crops of wood (usually saw timber); and that has not been withdrawn from timber cutting.

Reserved forest land.--Forest land that has been withdrawn from commercial timber use through statute, ordinance, or administrative order.

Tree Classes

Saw-timber tree.--A softwood tree not less than 9.0 inches in diameter at breast height (d.b.h.) or hardwood tree not less than 11.0 inches d.b.h. A saw-timber tree must contain at least one log 8 feet long. Half or more of the gross volume of the tree must be merchantable sawlog material.

Pole-timber tree.--A softwood and hardwood tree not less than 5 inches d.b.h. but less than the minimum size for saw timber. Such a tree must be at least 50 percent sound and must not be too rough or crooked to grow into a merchantable saw-timber tree.

Saplings and seedlings.--Trees smaller than pole-timber size.

Cull tree.--A live tree of saw-timber or pole-timber size that is unmerchantable for sawlogs now or prospectively because of defect or rot.

Stand-Size Classes

Saw-timber stand.--A stand of saw-timber trees having a net volume of 1,500 or more board feet per acre.

Pole-timber stand.--A stand failing to meet the saw-timber stand requirement but being at least 10 percent stocked with pole-timber and larger trees. Not less than half the stocking must be in pole-timber trees, and net volume must be not less than 200 cubic feet per acre.

Sapling and seedling stand.--An area not meeting the saw-timber stand or pole-timber stand requirements, but being at least 10 percent stocked with trees. Not less than half the stocking must be in saplings and seedlings.

Nonstocked area.--An area that fails to meet the minimum requirements for saw-timber, pole-timber, or sapling and seedling stands. These are the areas that are less than 10 percent stocked.

Timber Volume

Board-foot volume.--This includes only sawlog material in saw-timber trees (estimated through use of the International 1/4-inch rule). Sawlog material is that portion of the main stem between a 1-foot stump and the point at which utilization is limited by large branches, forks, or other deformities, or a diameter inside bark of not less than 6 inches for softwoods and 8 inches for hardwoods. Deductions have been made for cull--rot, crook, and other defects.

Cubic-foot volume.--All sound wood, excluding bark, in: (1) the sawlog portion of saw-timber trees, (2) the top portion of the main stem of saw-timber trees--segments too small for sawlog use but merchantable for certain other products such as pulpwood--to a minimum of 4 inches inside bark, and (3) the full stems of pole-timber trees to a minimum of 4 inches inside the bark. Cull trees were excluded but, in the sawlog portion of saw-timber trees, no deductions were made for cull unless it affected the wood structure.

Volume equivalent in cords is derived from the net cubic-foot volume (excluding bark) by applying a factor of 78 cubic feet per cord for softwoods and 65 cubic feet per cord for hardwoods. Although the number of cubic feet per cord varies with the size of material, these converting factors were used for all material in this report. The resulting figures approximate the volume of a standard stacked cord (4 feet by 4 feet by 8 feet), including bark.

Forest Types

Forest types are classified according to the species, or species group, that comprises the major portion of the stand in terms of board feet in saw-timber stands or number of stems in other stands.

Softwood types.--These include the hemlock (making up 50 percent or more of the stand), the white pine (making up 75 percent or more), the white pine-hardwood (white pine

comprising 50 to 74 percent and oak or other hardwoods 25 percent to 50 percent of the stand) and the spruce-fir type (spruce and fir together accounting for 75 percent or more of the stand.)

Hardwood types.--The names of these types are self-explanatory. Where softwoods are mentioned, the softwood component is less than 50 percent of the stand. In the oak types are stands in which the various species of oak are pure or predominating.

SPECIES

The various tree species tallied in District No. 1 are listed below.[1] Approved common names are shown in parentheses if these differ from the brief name used in the tables. Approved scientific names are underlined.

Softwoods

Spruce (Red spruce)	- Picea rubens
Hemlock (Eastern hemlock)	- Tsuga canadensis
White pine (Eastern white pine)	- Pinus strobus
(Red pine)	- Pinus resinosa
Other softwoods	
(Northern white-cedar)	- Thuja occidentalis
(Eastern redcedar)	- Juniperus virginiana
(Balsam fir)	- Abies balsamea

[1] U.S. Forest Service. CHECK LIST OF THE NATIVE AND NATURALIZED TREES OF THE UNITED STATES INCLUDING ALASKA. U.S. Dept. Agr. 325 pp. 1944.

Nonstocked area.--An area that fails to meet the minimum requirements for saw-timber, pole-timber, or sapling and seedling stands. These are the areas that are less than 10 percent stocked.

Timber Volume

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(Northern white-cedar)	- Thuja occidentalis
(Eastern redcedar)	- Juniperus virginiana
(Balsam fir)	- Abies balsamea

[1] U.S. Forest Service. CHECK LIST OF THE NATIVE AND NATURALIZED TREES OF THE UNITED STATES INCLUDING ALASKA. U.S. Dept. Agr. 325 pp. 1944.

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